

SEQUENCE LISTING

<110> Chen, Yih-Tai  
Cao, Longguang

<120> A synthetic DNA encoding an orange seapen-derived green fluorescent protein  
with codon preference of mammalian expression systems and biosensors

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<170> PatentIn version 3.1

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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
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PROTEIN

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Arg Gly	Asn Gly	Phe Pro	Ser Asn	Gly Pro	Val Met	Gln Lys	Ala Ile	
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Leu Val	Gly Glu	Val Asp	Leu Val	Tyr Lys	Leu Glu	Ser Gly	Asn Tyr	
		165			170		175	
Tyr Ser	Cys His	Met Lys	Thr Phe	Tyr Arg	Ser Lys	Gly Gly	Val Lys	
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Glu Phe	Pro Glu	Tyr His	Phe Ile	His His	Arg Leu	Glu Lys	Thr Tyr	
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
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Sequence

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
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Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr Lys Gly Gly Pro Leu  
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Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg  
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Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser  
65 70 75 80

Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly  
85 90 95

Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe  
100 105 110

His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro  
115 120 125

Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser Phe Glu Val Val  
130 135 140

Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp Leu Val Tyr Lys

145 150 155 160

Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys Thr Phe Tyr Arg  
165 170 175

Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His Phe Ile His His  
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35

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Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val  
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Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp  
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Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr  
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Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser  
100 105 110

Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg  
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Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu  
130 135 140

Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu  
145 150 155 160

Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr  
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Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu  
180 185 190

Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val  
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Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln Leu  
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Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser Met Glu  
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Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met Gln Ile  
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Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu
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Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp
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Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly
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Sequence

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Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile  
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PTILSARCA

Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile  
65 70 75 80

Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg  
85 90 95

Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile  
100 105 110

Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn  
115 120 125

Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met  
130 135 140

Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly  
145 150 155 160

Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys  
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His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro  
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Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu  
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Sequence

Gly	Ser	Phe	Val	Glu	Gln	His	Glu	Thr	Ala	Ile	Ala	Gln	Leu	Thr	Thr
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Phe	Gln	Tyr	Gly	Asn	Arg	Thr	Phe	Thr	Lys	Tyr	Pro	Asp	Asp	Ile	Ala
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# Sequence

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Pro	Ser	Phe	Glu	Val	Val	Tyr	Met	Asn	Ser	Gly	Val	Leu	Val	Gly	Glu
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Val	Asp	Leu	Val	Tyr	Lys	Leu	Glu	Ser	Gly	Asn	Tyr	Tyr	Ser	Cys	His
			165						170					175	
Met	Lys	Thr	Phe	Tyr	Arg	Ser	Lys	Gly	Gly	Val	Lys	Glu	Phe	Pro	Glu
			180					185					190		
Tyr	His	Phe	Ile	His	His	Arg	Leu	Glu	Lys	Thr	Tyr	Val	Glu	Glu	Gly
		195					200					205			
Ser	Phe	Val	Glu	Gln	His	Glu	Thr	Ala	Ile	Ala	Gln	Leu	Thr	Thr	Ile

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Val Glu Gly Ile Val Asn Asn His Val Phe Ser Met Glu Gly Phe Gly  
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Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr  
35 40 45

Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe  
50 55 60

Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp  
65 70 75 80

Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu



85	90	95
Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu		
100	105	110
Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe		
115	120	125
Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro		
130	135	140
Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val		
145	150	155
Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met		
165	170	175
Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr		
180	185	190
His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser		
195	200	205
Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly		
210	215	220

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Lys Pro Leu Gly Ser Leu His Glu Trp Val Phe Ala Ala
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<213> Ptilosarcus gurneyi

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Glu Gly Ile Val Asn Asn His Val Phe Ser Met Glu Gly Phe Gly Lys
20      25      30

Gly Asn Val Leu Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr Lys
35      40      45

Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln
50      55      60

Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr
65      70      75      80

Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg
85      90      95

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Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu  
100 105 110

Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro  
115 120 125

Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser  
130 135 140

Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp  
145 150 155 160

Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys  
165 170 175

Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His  
180 185 190

Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe  
195 200 205

Val	Glu	Gln	His	Glu	Thr	Ala	Ile	Ala	Gln	Leu	Thr	Thr	Ile	Gly	Lys
	210							215						220	

Pro Leu Gly Ser Leu His Glu Trp Val  
225 230

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35     40     45
Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln Tyr
50     55     60
Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr Phe
65     70     75     80
Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg Phe
85     90     95
Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu Asp
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PROTEIN

Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro Ser  
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Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser Phe  
130 135 140

Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp Leu  
145 150 155 160

Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys Thr  
165 170 175

Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His Phe  
180 185 190

Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe Val  
195 200 205

Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly Lys Pro  
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Leu Gly Ser Leu His Glu Trp Val  
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<213> Ptilosarcus gurneyi

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Val Leu Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr Lys Gly Gly  
35 40 45

Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln Tyr Gly  
50 55 60

Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr Phe Val  
65 70 75 80

Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg Phe Glu  
85 90 95

Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu Asp Asp  
100 105 110

Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro Ser Asn  
115 120 125

FASTA

Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser Phe Glu  
130 135 140

Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp Leu Val  
145 150 155 160

Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys Thr Phe  
165 170 175

Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His Phe Ile  
180 185 190

His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe Val Glu  
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Gly Ser Leu His Glu Trp Val  
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile



130

135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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50      55      60
Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65      70      75      80
Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85      90      95
Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100      105      110
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115      120      125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130      135      140
Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145      150      155      160

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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

ptilosarcus gurneyi.ST25.txt

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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys  
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln  
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Leu Thr  
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser  
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
35 40 45



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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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Leu Thr Thr  
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

FASTA

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr



195

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35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro

65 70 80  
~~75~~ 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
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Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
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Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys  
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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Leu Thr Thr Ile Gly  
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
 65 70 75 80

TELEFONO

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
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Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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105101 26844660

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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

FASTA

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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115
120
125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
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135
140
Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165
170
175
Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180
185
190
Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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215
220
Leu Thr Thr Ile Gly Lys Pro
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[illegible]

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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Arg Asn Leu Arg Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

$\langle 210 \rangle$  22



Case	Age	Sex	Height	Weight	Temp	Pulse	Respiration	Blood Pressure	Examination	Diagnosis	Prognosis	Treatment	Result
1	22	F	5' 2"	110	98.6	80	20	110/70	Normal	Normal	Good	None	12
2	24	F	5' 4"	120	98.6	80	20	110/70	Normal	Normal	Good	None	12
3	26	F	5' 6"	130	98.6	80	20	110/70	Normal	Normal	Good	None	12
4	28	F	5' 8"	140	98.6	80	20	110/70	Normal	Normal	Good	None	12
5	30	F	5' 10"	150	98.6	80	20	110/70	Normal	Normal	Good	None	12
6	32	F	5' 12"	160	98.6	80	20	110/70	Normal	Normal	Good	None	12
7	34	F	6' 0"	170	98.6	80	20	110/70	Normal	Normal	Good	None	12
8	36	F	6' 2"	180	98.6	80	20	110/70	Normal	Normal	Good	None	12
9	38	F	6' 4"	190	98.6	80	20	110/70	Normal	Normal	Good	None	12
10	40	F	6' 6"	200	98.6	80	20	110/70	Normal	Normal	Good	None	12
11	42	F	6' 8"	210	98.6	80	20	110/70	Normal	Normal	Good	None	12
12	44	F	6' 10"	220	98.6	80	20	110/70	Normal	Normal	Good	None	12
13	46	F	6' 12"	230	98.6	80	20	110/70	Normal	Normal	Good	None	12
14	48	F	7' 0"	240	98.6	80	20	110/70	Normal	Normal	Good	None	12
15	50	F	7' 2"	250	98.6	80	20	110/70	Normal	Normal	Good	None	12
16	52	F	7' 4"	260	98.6	80	20	110/70	Normal	Normal	Good	None	12
17	54	F	7' 6"	270	98.6	80	20	110/70	Normal	Normal	Good	None	12
18	56	F	7' 8"	280	98.6	80	20	110/70	Normal	Normal	Good	None	12
19	58	F	7' 10"	290	98.6	80	20	110/70	Normal	Normal	Good	None	12
20	60	F	7' 12"	300	98.6	80	20	110/70	Normal	Normal	Good	None	12

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<212> PRT
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<213> Ptilosarcus gurneyi

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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val	Ser	Ile	Ala	Phe	Gln	Tyr	Gly	Asn	Arg	Thr	Phe	Thr	Lys	Tyr	Pro
65					70					75				80	

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Arg Asn Leu Arg Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr

115

120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys  
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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Leu Thr Thr Ile Gly Lys Pro Leu Gly  
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<213> Ptilosarcus gurneyi

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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Glu Gln His Glu Thr Ala Ile Ala Gln  
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<213> Ptilosarcus gurneyi

<400> 24

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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35      40      45
Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50      55      60
Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65      70      75      80
Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85      90      95
Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100     105     110
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115     120     125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130     135     140

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Sequence

Leu Gly Met Glu Pro Ser Phe Glu Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Glu His Glu Thr Ala Ile Ala Gln  
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Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu  
225 230 235

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<213> Ptilosarcus gurneyi

<400> 25

Met Val Asn Arg Asn Val Leu Lys Asn Thr Gly Leu Lys Glu Ile Met  
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser  
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
145 150 155 160

EEAEEA

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser  
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Author	Year	Sample Size	Age Range	Gender	Location	Study Type	Findings
Smith et al.	2001	150	18-25	Male	USA	Experimental	High levels of aggression in response to provocation.
Johnson et al.	2003	200	19-26	Male	UK	Survey	Aggression levels decreased with age.
Lee et al.	2005	180	20-27	Male	Canada	Experimental	Aggression increased with alcohol consumption.
Wang et al.	2007	220	21-28	Male	China	Survey	Aggression levels were higher in urban areas.
Miller et al.	2009	160	22-29	Male	USA	Experimental	Aggression levels were higher in response to social exclusion.
Chen et al.	2011	190	23-30	Male	Taiwan	Survey	Aggression levels were higher in response to stress.
Ng et al.	2013	210	24-31	Male	Singapore	Survey	Aggression levels were higher in response to anger.
Patel et al.	2015	170	25-32	Male	India	Experimental	Aggression levels were higher in response to provocation.
Kim et al.	2017	230	26-33	Male	Korea	Survey	Aggression levels were higher in response to stress.
White et al.	2019	180	27-34	Male	USA	Experimental	Aggression levels were higher in response to social exclusion.
Green et al.	2021	200	28-35	Male	UK	Survey	Aggression levels were higher in response to anger.

Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met  
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
85 90 95

Tyr Glu Arg Arg Asn Leu Arg Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
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Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
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Leu Gly Met Glu Pro Ser Phe Glu Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr

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Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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35

40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile  
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro  
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe  
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg  
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr  
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile  
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val  
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr  
165 170 175

Ptilosarcus gurneyi.ST25.txt

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys  
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr  
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln  
210 215 220

Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu His Glu Trp  
225 230 235